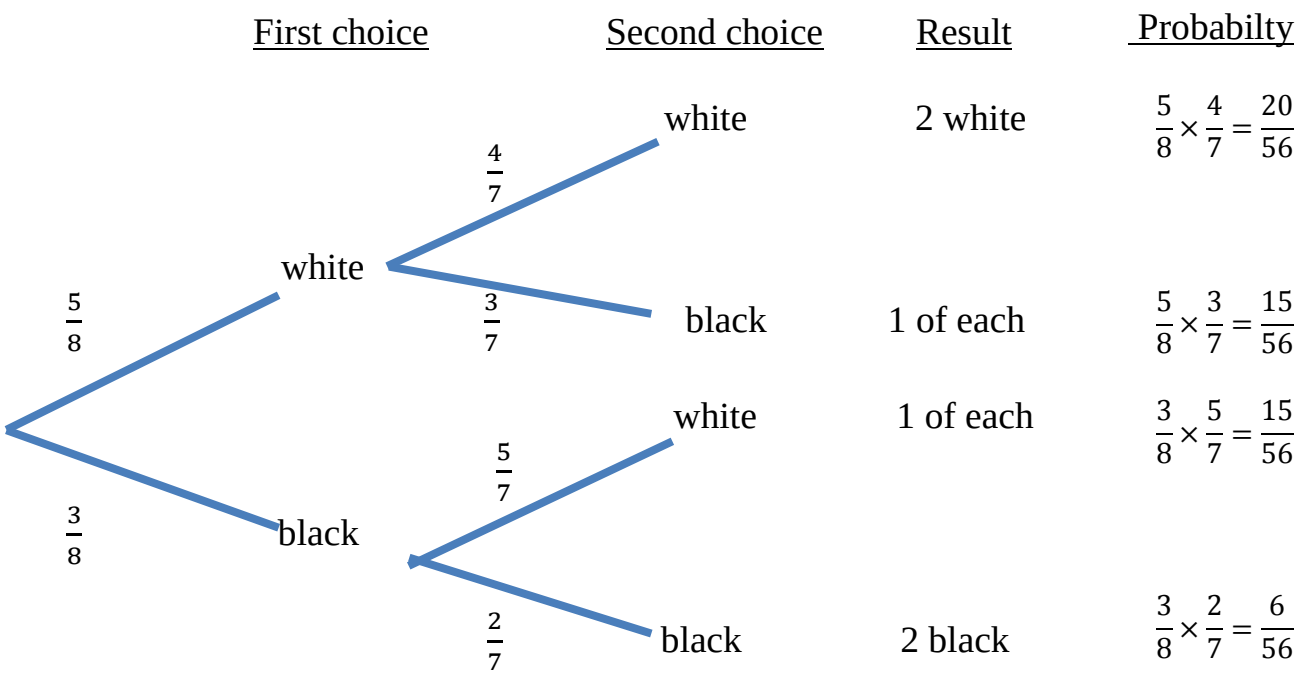
A bag contains 5 white and 3 black balls, and two balls are drawn at random. What is the probability that both are different colours?

As a student, this idea troubled me because you can't do this considering the two balls taken simultaneously.
You need to consider one at a time chosen as in this tree diagram:



The probability of 2 white = $\frac{5}{8}\times\frac{4}{7}=\frac{20}{56}$

The probability of 1st white and 2nd black = $\frac{5}{8}\times\frac{3}{7}=\frac{15}{56}$

The probability of 1st black and 2nd white = $\frac{3}{8}\times\frac{5}{7}=\frac{15}{56}$

The probability of 2 black = $\frac{3}{8}\times\frac{2}{7}=\frac{6}{56}$

The best way to think of this is:

There are 15 chances out of 56 of getting a white then a black and there are 15 chances out of 56 of getting a black then a white so that there are 30 chances out of 56 of getting one of each colour.

The required probability is $\frac{15}{56}+\frac{15}{56}=\frac{30}{56}$